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CLAIMS

SUB
AID
1. A method of dispersing an insoluble material in an aqueous solution comprising the following steps:

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- (i) providing a formulation comprising at least one insoluble material and at least one dispersant comprising a copolymer wherein said copolymer comprises a residue of a first comonomer and a residue of a second comonomer, wherein said first comonomer is an α,β -unsaturated oxyacid or anhydride and said second comonomer is an olefin having at least one polymerizable double bond and wherein the second comonomer is selected from the group consisting of β -pinene, 5-ethylidene-2-norbornene, methylene cyclohexane and methylene cyclopentene;

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- (ii) dispersing said formulation in an aqueous medium.

15

2. A method according to claim 1 wherein the copolymer contains additional comonomer residues which will not substantially change the character of the copolymer.

3. A method of treatment of a substrate with an insoluble material comprising the following steps:

20

- (i) preparing a formulation comprising at least one insoluble material and at least one dispersant comprising a copolymer wherein said copolymer comprises a residue of a first comonomer and a residue of a second comonomer, wherein said first comonomer is an α,β -unsaturated oxyacid or anhydride and said second comonomer is an olefin having at least one polymerizable double bond and wherein the second comonomer is selected from the group consisting of β -pinene, 5-ethylidene-2-norbornene, methylene cyclohexane and methylene cyclopentane;

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(ii) dispersing said formulation in an aqueous medium; and

(iii) applying the dispersed formulation to a substrate.

5 4. A method of treatment of a substrate with an insoluble material comprising the following steps:

10 (i) preparing a formulation comprising at least one insoluble material and at least one dispersant comprising a copolymer wherein said copolymer comprises a residue of a first comonomer and a residue of a second comonomer, wherein said first comonomer is an α,β -unsaturated oxyacid or anhydride and said second comonomer is an olefin having at least one polymerizable double bond and wherein the second comonomer is selected from the group consisting of limonene and similar terpenes, vinyl cyclohexanes, vinyl cyclohexenes, vinyl pyridines, vinyl thiophenes, vinyl naphthalenes, vinyl furans, vinyl pyrans and vinyl pyrrolidones;

15 (ii) dispersing said formulation in an aqueous medium; and

20 (iii) applying the dispersed formulation to a substrate.

5. A method of treatment of a substrate with an insoluble material comprising the following steps:

25 (i) preparing a formulation comprising at least one insoluble material and at least one dispersant comprising a copolymer wherein said copolymer comprises a residue of a first comonomer and a residue of a second comonomer, wherein said first comonomer is an α,β -unsaturated oxyacid or anhydride and said second comonomer is an olefin having at least one polymerizable double bond and wherein the second comonomer is an α -olefin having an alkyl group selected from the group consisting of diisobutylene, isobutylene, n-octene, n-decene, allylglycidylether or

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vinylisobutylether;

- (ii) dispersing said formulation in an aqueous medium; and
- 5 (iii) applying the dispersed formulation to a substrate.

6. A method of treatment of a substrate with an insoluble material comprising the following steps:

- 10 (i) preparing a formulation comprising at least one insoluble material and at least one dispersant comprising a copolymer wherein said copolymer comprises a residue of a first comonomer and a residue of a second comonomer, wherein said first comonomer is an α,β -unsaturated oxyacid or anhydride and said second comonomer is an olefin having at least one polymerizable double bond and wherein
- 15 at least one of said first comonomer and said second comonomer is substituted, wherein the substituents for said first comonomer are selected from the group consisting of esters, amides, thioesters and functional groups derived from reaction with nucleophilic reagents and wherein the substituents for the second comonomer are selected from the group consisting of epoxides; sulfonates; esters; amides; and
- 20 optionally substituted pendent aromatic and heteroaromatic groups wherein said optional substituents are selected from the group consisting of sulfonates, nitrates, phosphates and other substituents derived from reaction with electrophilic reagents, wherein said comonomer is in free acid form;
- 25 (ii) dispersing said formulation in an aqueous medium; and
- (iii) applying the dispersed formulation to a substrate.

30 7. A method of treatment of a substrate with an insoluble material comprising the

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following steps:

- 5 (i) preparing a formulation comprising at least one insoluble material and at least one dispersant comprising a copolymer wherein said copolymer comprises a residue of a first comonomer and a residue of a second comonomer, wherein said first comonomer is an α,β -unsaturated oxyacid or anhydride and said second comonomer is an olefin having at least one polymerizable double bond and wherein at least one of said first comonomer and said second comonomer is substituted, wherein the substituents for said first comonomer are selected from the group consisting of esters, amides, thioesters and functional groups derived from reaction with nucleophilic reagents and wherein the substituents for the second comonomer are selected from the group consisting of epoxides; sulfonates; esters; amides; and optionally substituted pendent aromatic and heteroaromatic groups wherein said optional substituents are selected from the group consisting of sulfonates, nitrates, phosphates and other substituents derived from reaction with electrophilic reagents, wherein the dispersant is a water-soluble agriculturally acceptable derivative of the copolymer wherein said derivative is selected from the group consisting of polyalkyleneoxy derivatives, polyethyleneglycol derivatives, polyamide derivatives and polyvinyl alcohol derivatives;
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- 20 (ii) dispersing said formulation in an aqueous medium; and
- (iii) applying the dispersed formulation to a substrate.

25 8. A method of treatment of a substrate with an insoluble material comprising the following steps:

- (i) preparing a formulation comprising at least one insoluble material, a surfactant wetting agent and at least one dispersant comprising a copolymer wherein said copolymer comprises a residue of a first comonomer and a residue of a second
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comonomer, wherein said first comonomer is an α,β -unsaturated oxyacid or anhydride and said second comonomer is an olefin having at least one polymerizable double bond and wherein at least one of said first comonomer and said second comonomer is substituted, wherein the substituents for said first comonomer are selected from the group consisting of esters, amides, thioesters and functional groups derived from reaction with nucleophilic reagents and wherein the substituents for the second comonomer are selected from the group consisting of epoxides; sulfonates; esters; amides; and optionally substituted pendent aromatic and heteroaromatic groups wherein said optional substituents are selected from the group consisting of sulfonates, nitrates, phosphates and other substituents derived from reaction with electrophilic reagents;

(ii) dispersing said formulation in an aqueous medium; and

(iii) applying the dispersed formulation to a substrate.

8. A method of dispersing active water-insoluble agrochemical principal in an aqueous solution comprising the following steps:

(i) providing a formulation comprising at least one active water-insoluble agrochemical principal and at least one dispersant comprising a copolymer wherein said copolymer comprises a residue of a first comonomer and a residue of a second comonomer, wherein said first comonomer is an α,β -unsaturated oxyacid or anhydride and said second comonomer is an olefin having at least one polymerizable double bond and wherein at least one of said first comonomer and said second comonomer is substituted, wherein the substituents for said first comonomer are selected from the group consisting of esters, amides, thioesters and functional groups derived from reaction with nucleophilic reagents and wherein the substituents for the second comonomer are selected from the group consisting of epoxides; sulfonates; esters; amides; and optionally substituted pendent aromatic

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and heteroaromatic groups wherein said optional substituents are selected from the group consisting of sulfonates, nitrates, phosphates and other substituents derived from reaction with electrophilic reagents;

5 (ii) dispersing said formulation in an aqueous medium.

10. A method according to claim 9 wherein the first comonomers are selected from the group consisting of fumaric acid, maleic acid and anhydrides, and the esters, amides and imides derived from them, itaconic acid and anhydride and the corresponding esters amides and imides derived from them, acrylic and methacrylic acids and the corresponding esters and amides derived from them, vinylphosphonic acid and the corresponding esters and amides derived from it and ethylene sulphonic acid and the esters and amides derived from it.

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11 A method according to claim 9 wherein the second comonomer is selected from the group consisting of β -pinene, 5-ethylidene-2-norbornene, methylene cyclohexane and methylene cyclopentane.

20 12. A method according to claim 9 wherein the second comonomer is selected from the group consisting of substituted and unsubstituted norbornene, cyclopentadiene and substituted cyclopentadienes, substituted and unsubstituted dicyclopentadienes, cyclohexenes, furans and indenenes.

25 13. A method according to claim 9 wherein the second comonomer is selected from the group consisting of limonene and similar terpenes, vinyl cyclohexanes, vinyl cyclohexenes, vinyl pyridines, vinyl thiophenes, vinyl naphthalenes, vinyl furans, vinyl pyrans and, vinyl pyrrolidones.

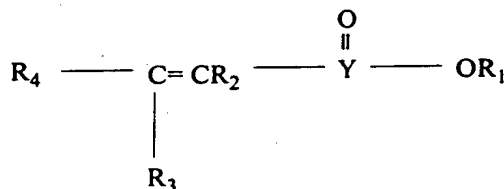
30 14. A method according to claim 9 wherein the second comonomer is an α -olefin

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having an alkyl group selected from the group consisting of diisobutylene, isobutylene, n-octene, n-decene, allyglycidylether or vinylisobutylether.

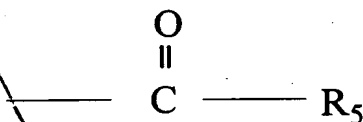
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15. A method according to claim 9 wherein the first comonomer has a structure I



I

wherein R₁ is a metal, quaternary ammonium, phosphonium or sulphonium residue, R₂ is hydrogen or C₁ to C₄ alkyl, Y is a carbon atom, O=S, or POR where R is a hydrogen atom or alkyl radical having from 1 to 10 carbon atoms (or carboxylated such radical) and R₄ is H, an alkyl radical or a carboxylic acid derivative of formula II



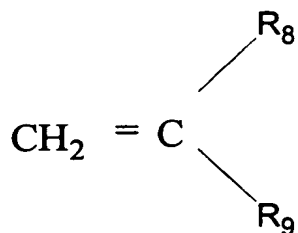
II

15 wherein R₅ is OR₆, NR₆R₇ or SR₆,

wherein R₆ and R₇ are H, alkyl, O-alkyl, or alkyl groups with a hetero atom substituent.

16. A method according to claim 9 wherein the second comonomer is a vinyl compound of formula III

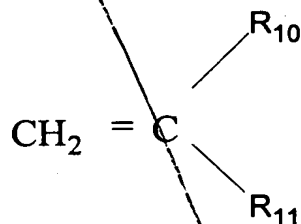
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III

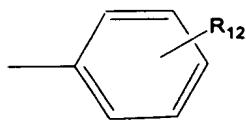
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wherein R_8 represents hydrogen, a straight or branched chain alkyl of from 1-4 carbon atoms, R_9 represents hydrogen, a branched chain alkyl radical of from 1-12 carbon atoms, or cycloalkyl radical, and/or a vinyl compound of formula IV

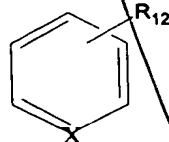


IV

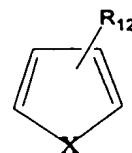
wherein R_{10} is a straight or branched chain alkyl radical of from 1-4 carbons and R_{11} is given by formula V, VI or VII,



V



VI



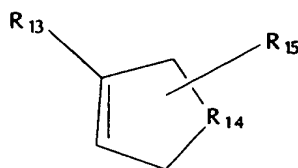
VII

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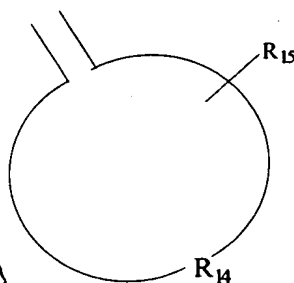
wherein R_{12} represents one or more alkyl radicals or one or more of H, Cl, OR and SO_3R_1 , NO_2 , PO_3R_1 and X is a hetero atom other than carbon; and/or an olefin shown by formula VIII,

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**VIII**

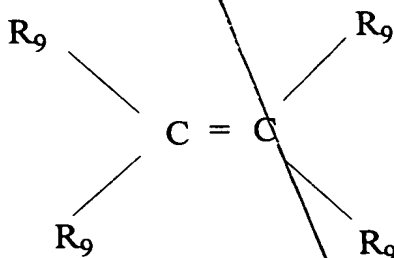
wherein R_{13} is Cl, SO_3R_1 , alkyl, O-alkyl or O-aryl, and R_{14} represents from 4-20 carbon atoms such as to make a cyclic or polycyclic alkane or polyalkenyl compound, R_{15} is an
10 epoxide or SO_3R_1 reacted with an unsaturated portion of the ring comprising R_{14} ; and/or an exocyclic olefin shown by formula IX

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**IX**

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and/or an internal olefin shown by formula X,

**X**

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where R_9 is the same or different and as hereinabove defined.

17. A method according to claim 9 wherein the copolymer contains additional comonomer residues which will not substantially change the character of the copolymer.

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18. An agricultural formulation comprising at least one insoluble material and at least one dispersant comprising a copolymer wherein said copolymer comprises a residue of a first comonomer and a residue of a second comonomer, wherein said first comonomer is an α, β -unsaturated oxyacid or anhydride and said second comonomer is an olefin having at least one polymerizable double bond and wherein at least one of said first comonomer and said second comonomer is substituted, wherein the substituents for said first comonomer are selected from the group consisting of esters, amides, thioesters and functional groups derived from reaction with nucleophilic reagents and wherein the substituents for the second comonomer are selected from the group consisting of epoxides; sulfonates; esters; amides; and optionally substituted pendent aromatic and heteroaromatic groups wherein said optional substituents are selected from the group consisting of sulfonates, nitrates, phosphates and other substituents derived from reaction with electrophilic reagents.

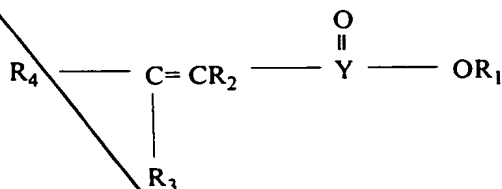
19. An agricultural formulation according to claim 18 wherein the formulation is in the form of a suspension concentrate (SC), a wettable powder (WP) or a water dispersible granule (WG).

20. An agricultural formulation according to claim 18 wherein first comonomers are selected from the group consisting of fumaric acid, maleic acid and anhydrides, and the esters, amides and imides derived from them, itaconic acid and anhydride and the corresponding esters amides and imides derived from them, acrylic and methacrylic acids and the esters and amides derived from them, vinylphosphonic acid and the corresponding esters and amides derived from it and ethylene sulphononic acid and the esters and amides derived from it.

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21. An agricultural formulation according to claim 18 wherein the second comonomers are selected from the group consisting of β -pinene, 5-ethylidene-2-norbornene, methylene cyclohexane and methylene cyclopentane.
- 5 22. An agricultural formulation according to claim 18 wherein the second comonomers are selected from the group consisting of substituted and unsubstituted norbornene, cyclopentadiene and substituted cyclopentadienes, substituted and unsubstituted dicyclopentadienes, cyclohexenes, furans and indenenes.
- 10 23. An agricultural formulation according to claim 18 wherein the second comonomers are selected from the group consisting of limonene and similar terpenes, vinyl cyclohexanes, vinyl cyclohexenes, vinyl pyridines, vinyl thiophenes, vinyl naphthalenes, vinyl furans, vinyl pyrans and, vinyl pyrrolidones.
- 15 24. An agricultural formulation according to claim 18 wherein the first comonomers are selected from the group consisting of an α -olefin having an alkyl group selected from the group consisting of diisobutylene, isobutylene, n-octene, n-decene, allylglycidylether or vinylisobutylether.
- 20 25. An agricultural formulation according to claim 18 wherein the first comonomers are selected from the group consisting of structure I



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wherein R_1 is a metal, quaternary ammonium, phosphonium or sulphonium residue, R_2 is hydrogen or C_1 to C_4 alkyl, Y is a carbon atom, $\text{O}=\text{S}$, or POR where R is a hydrogen

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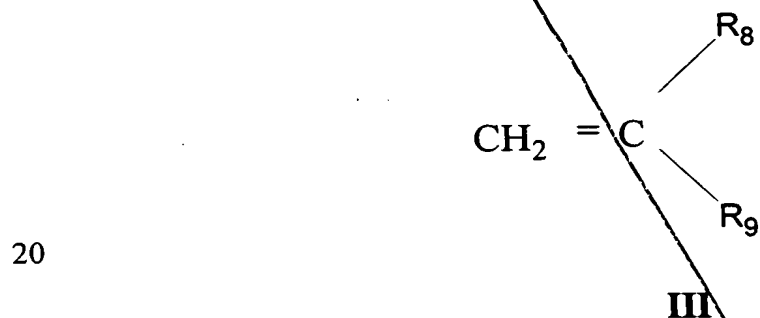
atom or alkyl radical having from 1 to 10 carbon atoms (or carboxylated such radical) and R_4 is H, an alkyl radical or a carboxylic acid derivative of formula II



10 wherein R_5 is OR_6 , NR_6R_7 or SR_6 ,

wherein R_6 and R_7 are H, alkyl, O-alkyl, or alkyl groups with a hetero atom substituent.

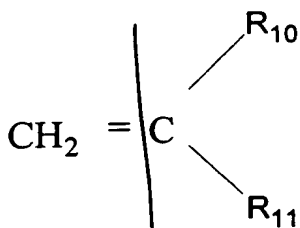
26. An agricultural formulation according to claim 18 wherein the first comonomer is
15 selected from the group consisting of III



wherein R_8 represents hydrogen, a straight or branched chain alkyl of from 1-4 carbon atoms, R_9 represents hydrogen, a branched chain alkyl radical of from 1-12 carbon atoms, or a cycloalkyl radical, and/or a vinyl compound of formula IV

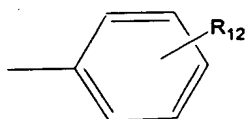
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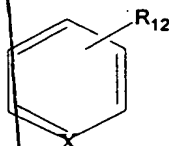


IV

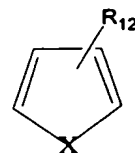
wherein R_{10} is a straight or branched chain alkyl radical of from 1-4 carbons and R_{11} is given by formula V, VI or VII,



V

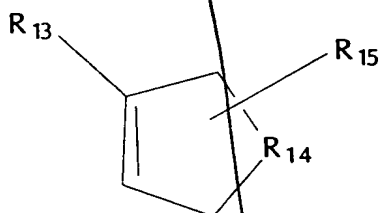


VI



VII

wherein R_{12} represents one or more alkyl radicals or one or more of H, Cl, OR and SO_3R , NO_2 , PO_3R and X is a hetero atom other than carbon; and/or an olefin shown by formula VIII,



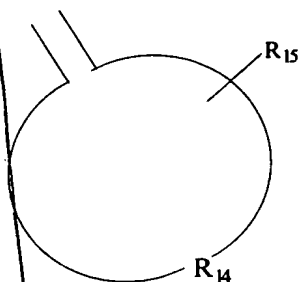
VIII

wherein R_{13} is Cl, SO_3R , alkyl, O-alkyl or O-aryl, and R_{14} represents from 4-20 carbon atoms such as to make a cyclic or polycyclic alkane or polyalkenyl compound, R_{15} is an

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epoxide or SO_3R_1 reacted with an unsaturated portion of the ring comprising R_{14} ;
and/or an exocyclic olefin shown by formula IX

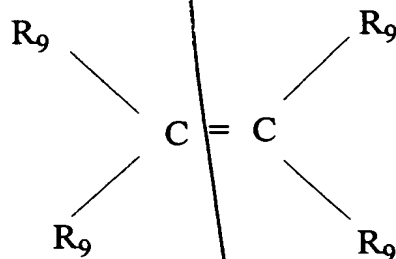
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IX

and/or an internal olefin shown by formula X,



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X

where R_9 is the same or different and as hereinabove defined.

27. An agricultural formulation according to claim 18 wherein the copolymer contains
20 additional comonomer residues which will not substantially change the character of the
copolymer.

28. An agricultural formulation according to claim 18 wherein the dispersant is readily

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soluble in water.

29. An agricultural formulation according to claim 18 wherein the dispersant is an agriculturally acceptable salt of the copolymer and wherein the salt comprises sodium, potassium and/or ammonium ions.

30. An agricultural formulation according to claim 18 wherein the copolymer is polyanionic.

31. An agricultural formulation according to claim 18 wherein the copolymer is in the form of its free acid.

32. An agricultural formulation according to claim 18 wherein the dispersant is a water-soluble agriculturally acceptable derivative of the copolymer wherein said derivative is selected from the group consisting of polyalkyleneoxy derivatives, polyethyleneglycol derivatives, polyamide derivatives and polyvinyl alcohol derivatives.

33. An agricultural formulation according to claim 18 wherein copolymers are in the range of from 1000 to 90000 daltons.

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34. An agricultural formulation according to claim 18 wherein the water-insoluble materials are selected from the group consisting of herbicides, insecticides, fungicides, biocides, molluscicides, algaicides, plant growth regulators, anthelmintics, rodenticides, nematocides, acaricides, amoebicides, protozoacides, fertilizers, crop safeners, fillers and carriers and other adjuvants.

35. An agricultural formulation according to claim 18 wherein the formulation further comprises a surfactant wetting agent.

36. An agricultural formulation according to claim 35 wherein the surfactant wetting

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agent is selected from the group consisting of an alkylpolysaccharide; di or mono alkyl sulphosuccinate derivative; a nonionic surfactant loaded onto an inert silicate carrier; and a non-ionic surfactant delivered in the form of a urea surfactant complex.

37. A method of making an agrochemical formulation comprising the steps of:

- (i) combining at least one insoluble material, and at least one dispersant comprising a copolymer wherein said copolymer comprises a residue of a first comonomer and a residue of a second comonomer, wherein said first comonomer is an α,β -unsaturated oxyacid or anhydride and said second comonomer is an olefin having at least one polymerizable double bond and wherein at least one of said first comonomer and said second comonomer is substituted, wherein the substituents for said first comonomer are selected from the group consisting of esters, amides, thioesters and functional groups derived from reaction with nucleophilic reagents and wherein the substituents for the second comonomer are selected from the group consisting of epoxides; sulfonates; esters; amides; and optionally substituted pendent aromatic and heteroaromatic groups wherein said optional substituents are selected from the group consisting of sulfonates, nitrates, phosphates and other substituents derived from reaction with electrophilic reagents.

38. A method according to claim 37 comprising the steps of:

- (i) combining at least one insoluble material, and at least one dispersant comprising a copolymer wherein said copolymer comprises a residue of a first comonomer and a residue of a second comonomer, wherein said first comonomer is an α,β -unsaturated oxyacid or anhydride and said second comonomer is an olefin having at least one polymerizable double bond and wherein at least one of said first comonomer and said second comonomer is substituted, wherein the substituents for said first comonomer are selected from the group consisting of esters, amides, thioesters and functional groups derived from reaction with nucleophilic reagents

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and wherein the substituents for the second comonomer are selected from the group consisting of epoxides; sulfonates; esters; amides; and optionally substituted pendent aromatic and heteroaromatic groups wherein said optional substituents are selected from the group consisting of sulfonates, nitrates, phosphates and other substituents derived from reaction with electrophilic reagents;

(ii) milling said combination to a particle size range in order to obtain a stable, readily-suspendible aqueous dispersion; and

(iii) stabilising said aqueous dispersion to obtain an SC formulation suitable for dilution in water for agricultural use.

38. A method according to claim 37 comprising the steps of:

(i) combining at least one insoluble material, with at least one dispersant comprising a copolymer wherein said copolymer comprises a residue of a first comonomer and a residue of a second comonomer, wherein said first comonomer is an α,β -unsaturated oxyacid or anhydride and said second comonomer is an olefin having at least one polymerizable double bond and wherein at least one of said first comonomer and said second comonomer is substituted, wherein the substituents for said first comonomer are selected from the group consisting of esters, amides, thioesters and functional groups derived from reaction with nucleophilic reagents and wherein the substituents for the second comonomer are selected from the group consisting of epoxides; sulfonates; esters; amides; and optionally substituted pendent aromatic and heteroaromatic groups wherein said optional substituents are selected from the group consisting of sulfonates, nitrates, phosphates and other substituents derived from reaction with electrophilic reagents; and

(ii) milling said combination to a desired particle size to obtain a homogeneous wettable powder (WP) formulation.

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39. A method according to claim 37 comprising the steps of:

- 5 (i) combining at least one insoluble material suitable for agricultural use with at least one dispersant comprising a copolymer wherein said copolymer comprises a residue of a first comonomer and a residue of a second comonomer, wherein said first comonomer is an α,β -unsaturated oxyacid or anhydride and said second comonomer is an olefin having at least one polymerizable double bond and wherein at least one of said first comonomer and said second comonomer is substituted, wherein the substituents for said first comonomer are selected from the group consisting of esters, amides, thioesters and functional groups derived from reaction with nucleophilic reagents and wherein the substituents for the second comonomer are selected from the group consisting of epoxides; sulfonates; esters; amides; and optionally substituted pendent aromatic and heteroaromatic groups wherein said optional substituents are selected from the group consisting of sulfonates, nitrates, phosphates and other substituents derived from reaction with electrophilic reagents; and
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- 20 (ii) blending said combination to obtain a homogeneous wettable powder (WP) formulation.

40. A method according to claim 37 comprising the steps of:

- 25 (i) combining at least one insoluble material suitable for agricultural use with at least one dispersant comprising a copolymer wherein said copolymer comprises a residue of a first comonomer and a residue of a second comonomer, wherein said first comonomer is an α,β -unsaturated oxyacid or anhydride and said second comonomer is an olefin having at least one polymerizable double bond and wherein at least one of said first comonomer and said second comonomer is substituted, wherein the substituents for said first comonomer are selected from the group
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consisting of esters, amides, thioesters and functional groups derived from reaction with nucleophilic reagents and wherein the substituents for the second comonomer are selected from the group consisting of epoxides; sulfonates; esters; amides; and optionally substituted pendent aromatic and heteroaromatic groups wherein said optional substituents are selected from the group consisting of sulfonates, nitrates, phosphates and other substituents derived from reaction with electrophilic reagents;

- (ii) agglomerating said combination to form discrete granular materials; and
- 10 (iii) drying said granular materials to obtain a water dispersible granule WG formulation.

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41. A method according to claim 37 wherein the first comonomers are selected from the group consisting of fumaric acid, maleic acid and anhydrides, and the esters, amides and imides derived from them, itaconic acid and anhydride and the corresponding esters amides and imides derived from them, acrylic and methacrylic acids and the corresponding esters and amides derived from them, vinylphosphonic acid and the corresponding esters and amides derived from it and ethylene sulphonic acid and the esters and amides derived from it.

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42. A method according to claim 37 wherein the second comonomer is selected from the group consisting of β -pinene, 5-ethylidene-2-norbornene, methylene cyclohexane and methylene cyclopentane.

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43. A method according to claim 37 wherein the second comonomer is selected from the group consisting of substituted and unsubstituted norbornene, cyclopentadiene and substituted cyclopentadienes, substituted and unsubstituted dicyclopentadienes, cyclohexenes, furans and indenenes.

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44. A method according to claim 37 wherein the second comonomer is selected from

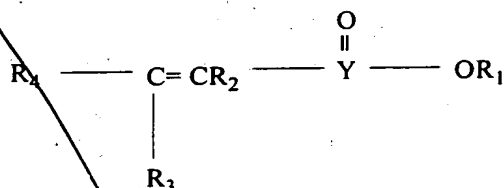
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the group consisting of limonene and similar terpenes, vinyl cyclohexanes, vinyl cyclohexenes, vinyl pyridines, vinyl thiophenes, vinyl naphthalenes, vinyl furans, vinyl pyrans and vinyl pyrrolidones.

Sub 16
45 A method according to claim 37 wherein the second comonomer is an α -olefin having an alkyl group selected from the group consisting of diisobutylene, isobutylene, n-octene, n-decene, allylglycidylether or vinylisobutylether.

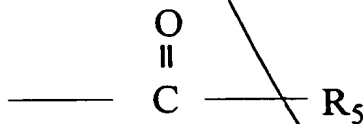
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46. A method according to claim 37 wherein the first comonomer has a structure I

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I

wherein R_1 is a metal, quaternary ammonium, phosphonium or sulphonium residue, R_2 is hydrogen or C_1 to C_4 alkyl, Y is a carbon atom, $\text{O}=\text{S}$, or POR where R is a hydrogen atom or alkyl radical having from 1 to 10 carbon atoms (or carboxylated such radical) and R_4 is H, an alkyl radical or a carboxylic acid derivative of form II



II

20 wherein R_5 is OR_6 , NR_6R_7 , SR_6 ,

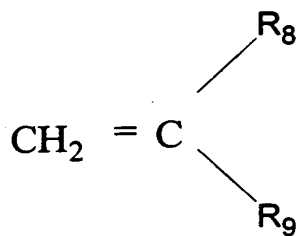
- 62 -

wherein R_6 and R_7 are H, alkyl, O-alkyl, or alkyl groups with a hetero atom substituent.

48
47.

A method according to claim 37 wherein the second comonomer has a structure III

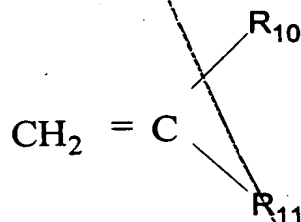
5



III

wherein R_8 represents hydrogen, a straight or branched chain alkyl of from 1-4 carbon atoms, R_9 represents hydrogen, a branched chain alkyl radical of from 1-12 carbon atoms, or a cycloalkyl radical,

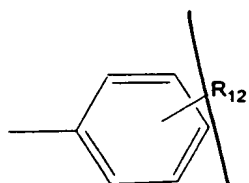
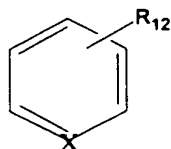
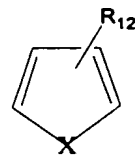
10 and/or a vinyl compound of formula IV



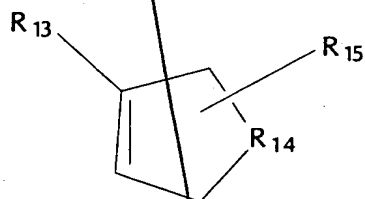
IV

wherein R_{10} is a straight or branched chain alkyl radical of from 1-4 carbons and R_{11} is
15 given by formula V, VI or VII,

- 63 -

**V****VI****VII**

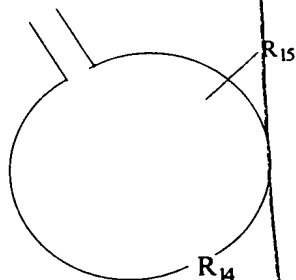
wherein R_{12} represents one or more alkyl radicals or one or more of H, Cl, OR and SO_3R_1 ,
 5 NO_2 , PO_3R_1 and X is a hetero atom other than carbon; and/or an olefin shown by formula VIII,

**VIII**

10

wherein R_{13} is Cl, SO_3R_1 , alkyl, O-alkyl or O-aryl, and R_{14} represents from 4-20 carbon atoms such as to make a cyclic or polycyclic alkane or polyalkenyl compound, R_{15} is an epoxide or SO_3R_1 reacted with an unsaturated portion of the ring comprising R_{14} ;

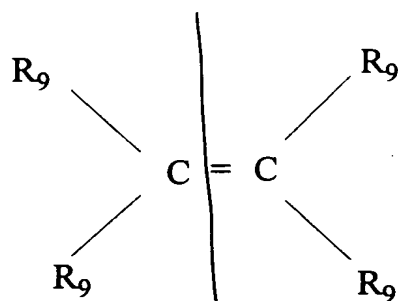
15 and/or an exocyclic olefin shown by formula IX

**IX**

and/or an internal olefin shown by formula X,

20

- 64 -



where R₉ is the same or different and as hereinabove defined.

5

49
48.

A method according to claim 37 wherein the copolymer contains additional comonomer residues which will not substantially change the character of the polymer.

50
49.

A method according to claim 37 wherein the dispersant is readily soluble in water.

10

51
50.

A method according to claim 37 wherein the dispersant is an agriculturally acceptable salt of the copolymer and wherein the salt comprises sodium, potassium and/or ammonium ions.

15 51.

A method according to claim 37 wherein the copolymer is polyanionic.

52
52.

A method according to claim 37 wherein the copolymer is in the form of its free acid.

53
53.

A method according to claim 37 wherein the dispersant is a water-soluble agriculturally acceptable derivative of the copolymer wherein said derivative is selected from the group consisting of polyalkyleneoxy derivatives, polyethyleneglycol derivatives, polyamide derivatives and polyvinyl alcohol derivatives.

54
54.

A method according to claim 37 wherein copolymers are in the range of from 1000

- 65 -

to 90000 daltons.

⁵⁶
55. A method according to claim 37 wherein the water-insoluble materials are selected from the group consisting of herbicides, insecticides, fungicides, biocides, molluscicides, 5 algaicides, plant growth regulators, anthelmintics, rodenticides, nematocides, acaricides, amoebicides, protozoacides, fertilizers, crop safeners, fillers and carriers and other adjuvants.

⁵⁷
56. An agricultural formulation produced by the method of any one of claims 37 to 40.

⁵⁸
57. A method of treatment of a substrate with an active water-insoluble agrochemical principal comprising the following steps:

- 15 (i) preparing a formulation comprising at least one active water-insoluble agrochemical principal and at least one dispersant comprising a copolymer wherein said copolymer comprises a residue of a first comonomer and a residue of a second comonomer, wherein said first comonomer is an α,β -unsaturated oxyacid or anhydride and said second comonomer is an olefin having at least one polymerizable double bond and wherein at least one of said first comonomer and 20 said second comonomer is substituted, wherein the substituents for said first comonomer are selected from the group consisting of esters, amides, thioesters and functional groups derived from reaction with nucleophilic reagents and wherein the substituents for the second comonomer are selected from the group consisting of epoxides; sulfonates; esters; amides; and optionally substituted pendent aromatic and heteroaromatic groups wherein said optional substituents are selected from the 25 group consisting of sulfonates, nitrates, phosphates and other substituents derived from reaction with electrophilic reagents;

- 30 (ii) dispersing said formulation in an aqueous medium; and

- 66 -

(iii) applying the dispersed formulation to a substrate.

⁵⁹
~~58.~~ A method according to claim 57 wherein the first comonomers are selected from the group consisting of fumaric acid, maleic acid and anhydrides, and the esters, amides and imides derived from them, itaconic acid and anhydride and the corresponding esters amides and imides derived from them, acrylic and methacrylic acids, esters and amides, vinylphosphonic acid and the corresponding esters and amides derived from it and ethylene sulphonic acid and the esters and amides derived from it.

⁶⁰
10 ~~59.~~ A method according to claim 57 wherein the second comonomer is selected from the group consisting of β -pinene, 5-ethylidene-2-norbornene, methylene cyclohexane and methylene cyclopentane.

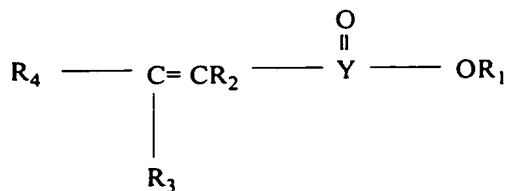
⁶¹
15 ~~60.~~ A method according to claim 57 wherein the second comonomer is selected from the group consisting of substituted and unsubstituted norbornene, cyclopentadiene and substituted cyclopentadienes, substituted and unsubstituted dicyclopentadienes, cyclohexenes, furans and indenenes.

⁶²
20 ~~61.~~ A method according to claim 57 wherein the second comonomer is selected from the group consisting of limonene and similar terpenes, vinyl cyclohexanes, vinyl cyclohexenes, vinyl pyridines, vinyl thiophenes, vinyl naphthalenes, vinyl furans, vinyl pyrans and, vinyl pyrrolidones.

⁶³
25 ~~62.~~ A method according to claim 57 wherein the second comonomer is an α -olefin having an alkyl group selected from the group consisting of diisobutylene, isobutylene, n-octene, n-decene, allylglycidylether or vinylisobutylether.

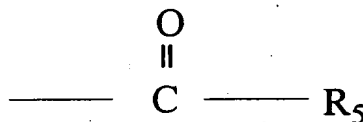
⁶⁴
~~63.~~ A method according to claim 57 wherein the first comonomer has a structure I

- 67 -



I

wherein R_1 is a metal, quaternary ammonium, phosphonium or sulphonium residue, R_2 is hydrogen or C_1 to C_4 alkyl, Y is a carbon atom, $\text{O}=\text{S}$, or POR where R is a hydrogen
 5 atom or alkyl radical having from 1 to 10 carbon atoms (or carboxylated such radical) and R_4 is H, an alkyl radical or a carboxylic acid derivative of formula II



II

10 wherein R_5 is OR_6 , NR_6R_7 , SR_6 ,

wherein R_6 and R_7 are H, alkyl, O-alkyl, or alkyl groups with a hetero atom substituent.

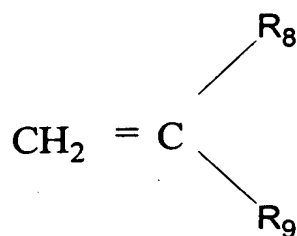
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- 68 -

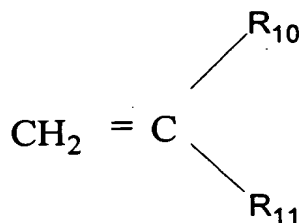
65.
64.

A method according to claim 57 wherein the second comonomer has a structure III



III

- 5 wherein R_8 represents hydrogen, a straight or branched chain alkyl of from 1-4 carbon atoms, R_9 represents hydrogen, a branched chain alkyl radical of from 1-12 carbon atoms, or a cycloalkyl radical, and/or a vinyl compound of formula IV

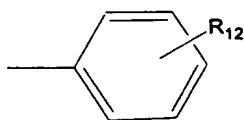


IV

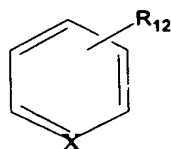
10

wherein R_{10} is a straight or branched chain alkyl radical of from 1-4 carbons and R_{11} is given by formula V, VI or VII,

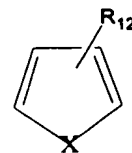
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V



VI

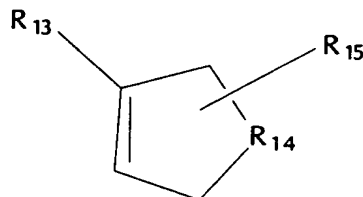


VII

- 69 -

wherein R_{12} represents one or more alkyl radicals or one or more of H, Cl, OR and SO_3R_1 , NO_2 , PO_3R_1 and X is a hetero atom other than carbon; and/or an olefin shown by formula VIII,

5

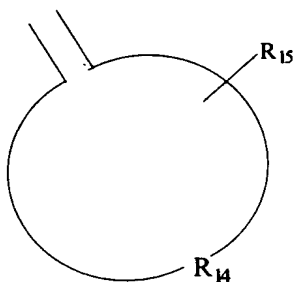


10

VIII

wherein R_{13} is Cl, SO_3R_1 , alkyl, O-alkyl or O-aryl, and R_{14} represents from 4-20 carbon atoms such as to make a cyclic or polycyclic alkane or polyalkenyl compound, R_{15} is an epoxide or SO_3R_1 reacted with an unsaturated portion of the ring comprising R_{14} ;

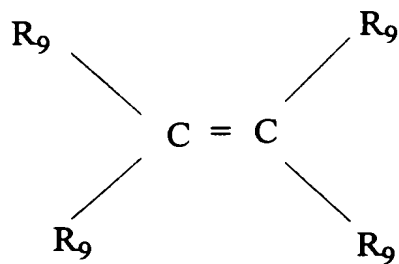
15 and/or an exocyclic olefin shown by formula IX

**IX**

and/or an internal olefin shown by formula X,

20

- 70 -

**X**

where R₉ is the same or different and as hereinabove defined.

5